

U.S. Serial No.: 10/517,906

Docket No. M02B129

Applicant: Andrew Miller CAMERON, et al.

Office Action Mailing Date: September 5, 2008

Response to Office Action Submitted: November 5, 2008

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of refining a ferroalloy, comprising blowing a gas selected from molecular oxygen and a gas mixture including molecular oxygen into a melt of the ferroalloy and exothermically reacting the molecular oxygen with carbon in the melt; introducing a metallurgically acceptable particulate material from above into the melt in a first supersonic gas jet which travels to the melt shrouded by a second supersonic gas jet; and forming velocities of the first and the second supersonic gas jets for controlling migration of said particulate material between said first and second supersonic gas jets, the velocity of the second supersonic gas jet being from 10% less to 10% greater than the velocity of the first supersonic gas jet.
2. (Previously Amended) A method according to claim 1, wherein the metallurgically acceptable particulate material is selected from the group consisting of metals that are to be included in the refined alloy, alloys of said metals, oxides of said metals, and mixtures thereof.
3. (Previously Amended) A method according to claim 1, wherein the ferroalloy contains at least 30% by weight of iron.
4. (Previously Amended) A method according to claim 1, wherein the ferroalloy is ferrochrome and the metallurgically acceptable particulate material comprises an oxide of chromium.
5. (Original) A method according to claim 4, wherein the oxide of chromium is chromite.
6. (Previously Amended) A method according to claim 1, wherein the metallurgically acceptable particulate material comprises ferrochrome.

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7. (Previously Amended) A method according to claim 1, wherein the ferroalloy is a stainless steel and the metallurgically acceptable particulate material is an oxide of chromium.
8. (Previously Amended) A method according to claim 1, wherein the ferroalloy is ferromanganese and the metallurgically acceptable particulate material is an oxide of manganese.
9. (Previously Amended) A method according to claim 1, wherein the metallurgically acceptable particulate material is introduced into the melt in fine particulate form.
10. (Currently Amended) A method according to claim 9, wherein the metallurgically acceptable particulate material has a mean particle size of the metallurgically-acceptable particulate material is 1 mm or less.
11. (Previously Amended) A method according to claim 1, wherein a gas that forms the first supersonic gas jet is selected from the group consisting of an oxidising gas, a non-oxidising gas, or a mixture of an oxidising gas and a non-oxidising gas.
12. (Original) A method according to claim 11, wherein the oxidising gas is oxygen.
13. (Previously Amended) A method according to claim 11, wherein the non-oxidising gas is selected from the group consisting of argon, steam and combinations thereof.
14. (Previously Amended) A method according to claim 1, wherein the second supersonic gas jet is formed of burning gases.
15. (Previously Amended) A method according to claim 1, wherein the first supersonic gas jet is ejected from a first Laval nozzle at a velocity in the range of Mach 1.5 to Mach 4 and the second supersonic gas jet is ejected from a second Laval nozzle at a velocity in the range of Mach 1.5 to Mach 4.

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16. (Previously Amended) A method according to claim 15, wherein the first and second Laval nozzles form part of a metallurgical lance comprising an axial first gas passage terminating at its outlet and in the first Laval nozzle, a shrouding gas passage about a main gas passage terminating at its outlet in the second Laval nozzle, and a particulate material transport passage having an axial outlet which communicates with the first Laval nozzle.
17. (Previously Amended) A method according to claim 16, wherein the axial outlet terminates in a divergent part of the first Laval nozzle.
18. (Previously Amended) A method according to claim 16, wherein the shrouding gas passage comprises a combustion chamber.
19. (Previously Amended) A method according to claim 1, wherein the metallurgically acceptable particulate material is introduced into the melt continuously during a first part of a refining operation.
20. (Previously Amended) A method according to claim 19, wherein the first supersonic gas jet comprises oxygen and introduction of the first supersonic gas jet into the melt continues after introduction of the metallurgically acceptable particulate material into the melt has ceased.
21. (Previously Amended) A method according to claim 20, wherein introduction of the first supersonic gas jet into the melt ceases before the end of the refining operation.